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IX.—*On the Propagation of Mining and Metallurgy.* By
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[*Read April 9th, 1867.*]

ONE prehistoric question is the supply of metals and diffusion of metallurgic processes. It is presumed that this must have been effected by a highly cultivated race, most likely the Phœnicians.

The subject is a wide one, and embraces many branches, and consequently admits of the attribution of more than one cause. All of these we may not, perhaps, find, but we may ascertain some of these causes. The history of the past is, to a certain extent, lost; but under some circumstances history repeats itself, and gives us representations of the past, just as a coin much faded on being heated will show for a few moments the obliterated legend. In some cases history is exhibited to us in the complications of ancient and modern institutions, which we see in the ruder empires; Turkey, for instance, where in the same plain the bullock cart of Homer and the railway locomotive are at work, the wooden plough of Hesiod and our latest steam plough.

One of the repetitions of history is sufficiently well displayed in Western Asia Minor. The mountains called the Besh Parmak, or Five Fingers, to the south of the Mæander river, opposite the ancient Tralles, or modern Aidin, contain extensive deposits of hæmatite iron ore in the form of iron sand. I have reason to consider these deposits extend along the mountains south of the Mæander for above one hundred miles, and that they are to be found in contiguous ranges to the north of the Hermus in the neighbourhood of Thyateira.

The Besh Parmak deposits are worked by gipsies or Chinganees. The workings are open pits and the mineral is smelted with brushwood in small furnaces of about a foot square. So far as I can ascertain, this resembles the mode of working followed in India. The iron, which is of good quality, is sold in the market towns of a wide extent of country by the gipsy men and women, chiefly in the form of horseshoes.

The Chalybes or Khalubes were, according to ancient historians, a mountain people in Asia Minor working iron, and spoken of from the mythic age down to a comparatively late historic period, when they were recognised in North-eastern Asia Minor.

The Khalubes were hill tribes, and so are the gipsies. The Khalubes most likely worked several sites in Asia Minor, and were a tribe engaged in this business.

The gipsies, as we well knew, are engaged in iron working in many of the countries in which they are settled, and it is one of their hereditary callings.

The gipsies within a few centuries spread over the whole of Europe, and might have introduced iron metallurgy. As we know, they did not, for they found it already established, but nevertheless they were in many instances able to engage in iron working.

If, during the middle ages, the gipsies were able to do this, we have evidence for the possibility of like tribes in a very few centuries spreading as far as from Mooltan or Kashmere to Spain, Britain, and Norway.

The migrations of a low tribe of this kind are very different in their character from those of a high or warlike tribe. The warlike tribes, whether grazing or seafaring, have made their migrations in great numbers, fighting their way by strength of arms and meeting foes at every step. A low tribe, contented with a low state of existence, perhaps family life in a filthy tent, will rather creep its way along, having little to be robbed of, being unprofitable servants and subjects, and robbing and cheating the populations through whose midst it passed.

As there are low parasites which pass through various forms and exist in different media, so it is with the low tribes; their conditions in migration may be very different from that in settlement, but they will migrate till they find their suitable parasitic abode.

To low metal-working tribes like the Khalubes and gipsies, we may look for one class of metal workers. The characteristic pursuits of low tribes are worthy of observation. Among those of low hill tribes I should place metal working, woodcraft, including timber cutting, and collecting honey and wax, and cattle feeding.

Gold working I consider to have been pursued very differently from iron working. It must have been much the same in all ages, an adventurous pursuit carried on in the style of the Spanish expeditions in hostile countries, or like Californian and Australian gold digging in thinly peopled countries.

Looking to the extensive supply of gold ornaments in ancient times, to the many known gold sites, and the present poverty of those sites, there can be little doubt that the diggings of Europe had been pretty well explored long before the historic period. The adventure of Jason and the Argonauts may be looked upon as the last of these expeditions, carried out on old traditions.

The Iberians, or the anterior races seated on their territory, must have pretty well exhausted the gold diggings. The Phœnicians I look upon as later participators in the commerce consequent on these operations. The Iberians of the east and their predecessors we must consider as the explorers of the Black Sea, and the Caspian, and their river systems; the Iberians of the west as the explorers of Gaul, Britain, and the Baltic. The real chronology of Phœnician nations will depend on the appearance of the Semitic race upon the theatre of the east, probably not much before that of the Indo-Europeans themselves, relatively later in the world's history than we have been accustomed to allow for. If it be true that the Iberians held the greater part of Asia Minor before the Hellenes, if, too, we can now by recent discoveries recognise an influence of Assyrian and not of Egyptian type in Asia Minor, so we must hesitate in acknowledging this influence as a primary action. The nationalities of the north and the south of Eastern Asia Minor show evident signs of displacement, and if we are to look upon the tribes of the Caucasus as allied to those of Central Asia, and displaced by Semitic and Indo-European invasions, then we may have to assign to the eastern border of the Iberians an extended and more ancient limit.

However this may be, whether the gold working of the Caspian were effected by an Iberian or a Caucaso-Tibetan race, the operation would always be the same in the first instance, surface workings by bands of explorers or marauders.

These might in some cases be succeeded by low races carrying on gold washing as in India, or by slaves as in Africa.

The gold diggings would, however, become poorer and poorer by exhaustion, and further supplies would be obtained at a later period by casual discoveries, or by the hard labour of gold working.

The supply of tin I look upon as contemporaneous with the supply of gold. Most tin grounds contain gold, and some gold countries contain tin. Cornwall still yields its grains of gold, and Australia and Peru afford tin. Tin is still in some examples found in the shape of dust as well as stones.

The scattered and outlying supplies of tin might first attract attention before the main supplies of tin in Spain and Cornwall concentrated attention for mining purposes. It is by no means essential to assume that these were primary centres, as the ready discovery of a small quantity of tin elsewhere may have caused search in the other formations. Armorica may have supplied tin before Britain.

Of the origin of copper mining it is less easy to form an idea. It is most likely that, as the metals gold and iron were known

in grains or sand, so copper sands first attracted attention, and that the exhaustion of the easily fusible minerals led to the adoption of the harder sulphurets and carbonates.

So, too, as to the origin of bronze, it is more difficult to suggest, and yet at a very early period the solution must have been effected.

Metallurgy once generally developed, the working of the readier forms of lead and silver lead ores is an easy stage.

There would be a wide difference between the rude metallurgy of the gold diggers, and the hill workers, and the more refined operations as surface supplies became less available, and the demands of civilisation were greater.

Then we reach another stage; slave and convict labour were extensively introduced, and vast enterprises were carried on year after year, of which we see the remains in ancient Spain, and know the mode of working in the mines of Southern America.

Iron may have been worked almost as early as copper, but, on account of its being found soft in the early manufacture, it may have been neglected like lead and silver, and like them postponed to other metals.

The same tribes may have been indifferently, according to geological location, copper, iron, or lead smelters.

The smelter once on the spot would not be readily displaced. The neighbouring chief would be contented with tribute in kind, and the shepherd or husbandman of the plain, with his women, would have small liking to change places with the miner and his grimy host.